

North Pacific Research Board Semiannual Progress Report

Project #: R0304

Title: Deep Sea Coral Distribution and Habitat in the Aleutian Archipelago

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Project Summary: This project seeks to provide the first detailed mapping of coral and sponge habitats for the Aleutian Islands, where species diversity appears to be unusually high and where incidental mortality of corals and sponges is a challenging problem in the area's fisheries that use bottom contact gear. A statistical model will be made to predict coral and sponge distribution as a function of measurable environmental characteristics, and if successful, this predictive model can be used to inform management decisions for protecting corals and sponges in areas lacking detailed mapping and dive-supported observations. Further, this work will provide estimates of the relative abundance of corals and sponges, their importance to commercially valuable fish and invertebrates, and the degree to which these living substrates have been disturbed, including disturbance by fishing gear.

Progress Summary: Field operations began in June 2003. The seafloor mapping operations were successfully conducted during a 22.5-day cruise on the R/V *Davidson*. The cruise began in Seward on June 10 and ended in Dutch Harbor on July 3. The mapping cruise and the *DELTA* submersible cruise on the R/V *Velero IV* overlapped by six days. Consequently, the science party had to be split, with the geologists (Reynolds, Vallier) sailing on the *Davidson* and the biologists (Stone, Woodby and others) on the *Velero IV*. Dr. Jon Heifetz from NMFS, Auke Bay Lab (ABL) was unable to participate due to scheduling conflicts. To partly ameliorate this situation, NMFS ABL sent a biologist on the *Davidson*, Ms. Alyssa Joyce, who had participated in a NMFS mapping project in Southeast Alaska during summer 2002.

Chief scientist for the mapping cruise was Dr. Jennifer Reynolds. Due to scheduling conflicts Dr. Gary Greene of Moss Landing Marine Lab was unable to participate, but he arranged for Dr. Tracy Vallier to join the cruise in his place. Dr. Vallier is retired from the USGS where he was Project Chief for marine research in the Bering Sea and Aleutian Island Arc in the 1970s and 1980s. Dr. Vallier is currently affiliated with the Center for Habitat Studies (Gary Greene's lab) at Moss Landing Marine Laboratory, and has experience in benthic habitat mapping in California waters.

Tests of the Reson SeaBat 8111 (100 kHz) and 8150 (24 kHz) multibeam sonar systems were successfully conducted in Seward's harbor immediately after leaving the dock on June 10. The vessel

arrived at the first map site, south of Amliia Island, just after midnight on June 14. Over the next eighteen days, a total of seventeen sites were mapped throughout the central Aleutians with a combination of 100 kHz and 24 kHz multibeam systems. During two of the site surveys, rough weather forced a change in the orientation of the survey lines, but no survey time was actually lost to weather.

Wherever possible, the sites were mapped from 50m to 3000m water depth, using the 100 kHz sonar down to ~400m water depth, and 24 kHz at greater depth. The 100 kHz sonar produced excellent bathymetric and backscatter data (Figure 1). The 24 kHz bathymetry data were also excellent, though necessarily of lower resolution. Unfortunately, the 24 kHz backscatter data does not appear to be useful, as they are strongly dominated by slope effects and therefore repeat information already contained in the bathymetry data.

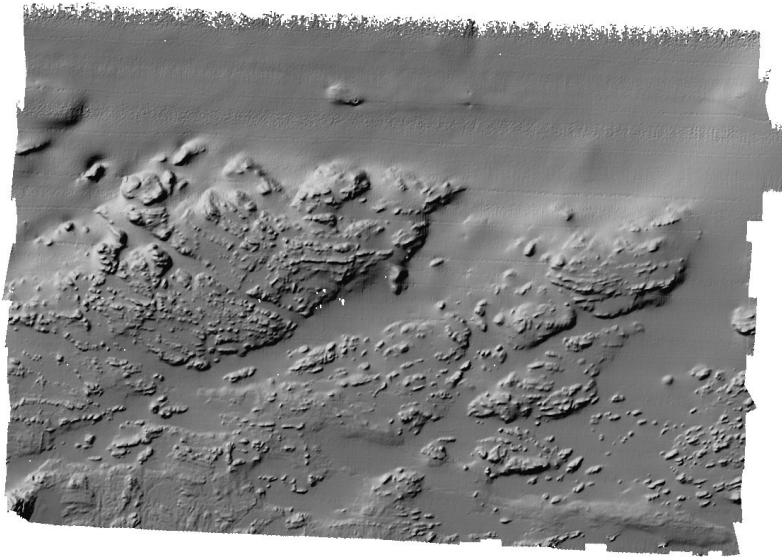


Figure 1. Example of a preliminary bathymetric map produced with the 100 kHz multibeam mapping system during the R/V *Davidson* cruise to the Aleutian Islands.

Preliminary habitat interpretations of the 100 kHz data were done at sea for immediate use by the biologists conducting *Delta* dives. This activity focused on the 100 kHz data because the 24 kHz data were all beyond the depth limit of the *Delta* submersible. For Sites 1-14, we also selected dive tracks that would cross all habitat types in each site. As the R/V *Velero IV* reached the study area, it became apparent that a data transfer at sea was both possible and desirable. Paper copies and digital files (on CD) of bathymetric maps for Sites 1-14, along with the suggested dive tracks, were delivered to the *Velero IV* at a rendezvous in Banner Bay (Atka Island) on June 30.

Geologic features noted in the preliminary habitat interpretations included: bedrock outcrops of various types; faults, joints, and bedding planes; gulleys and canyons; submerged glacial moraines; unconsolidated sediment of different acoustic backscatter intensities, interpreted as, mud, sand and gravel; large fields of sediment ripples and waves; and coarse volcanoclastic debris down slope from the active volcanoes on the north side of the islands. One of the sites included a “new” submarine volcano, discovered by the NMFS biologists during an exploratory *Delta* dive in summer, 2002 (see <http://www.sfos.uaf.edu/news/2003/0811volcano.html>).

Surveys of coral and sponge distribution in the central Aleutian Islands began in late June using the R/V *Delta* submersible and the support vessel *Velero IV* (Figure 2). Charter of the submersible and support



Figure 2. Launching the Delta two-person submersible near Semisopochnoi Island in the Aleutians.

vessel was an in-kind contribution to the project provided by NMFS ABL. Chief scientist was Robert Stone NMFS, ABL. Also participating were Dr. Doug Woodby (ADF&G), Patrick Malecha (NMFS, ABL), Dean Courtney (NMFS, ABL) and Sandra Brooke (Oregon Institute of Marine Biology). Three submersible dives were completed in the period 28-30 June in the central Aleutians north of Amlia Island and one SCUBA diving operation was conducted on 30 June north of Atka Island (Figure 3). High winds precluded diving for approximately two-thirds of the three-day period. Observations from the submersible north of Amlia Island confirmed disturbance to stands of sea whips (*Halipteris willemoesi*), a colonial octocoral, at depths of approximately 100 m on sand/silt substrates known to have a history of frequent bottom trawling activity. The majority of the 2003 dive operations were conducted in July subsequent to the end of this reporting period.

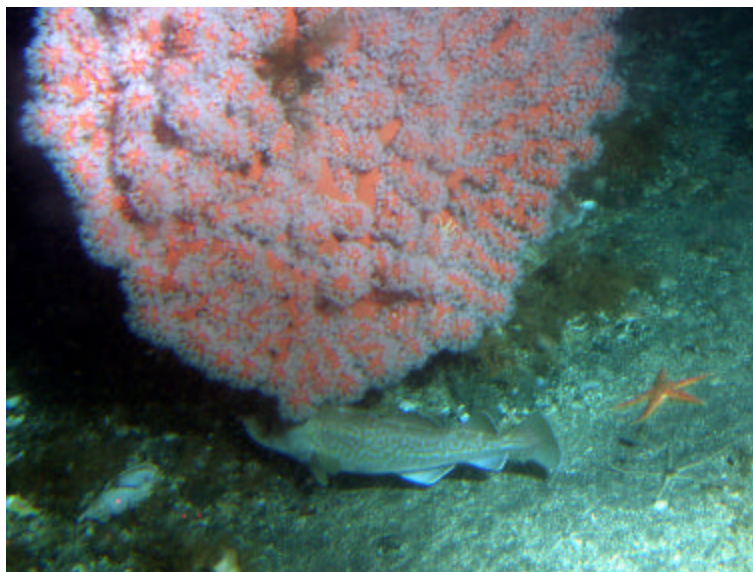


Figure 3. Bubble gum coral (*Paragorgia* sp.) and Pacific cod (*Gadus macrocephalus*) observed from the *Delta* submersible.